



CHHATRAPATI SHIVAJI MAHARAJ INSTITUTE OF TECHNOLOGY

Affiliated to the Mumbai University, Approved By AICTE - New Dehli.

DTE Maharashtra (DTE Code : 3477)

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1.	Energy Audit	ELION TECHNOLOGIES & CONSULTING P. LTD.	2023-2024
2.	Green Audit	ELION TECHNOLOGIES & CONSULTING P. LTD.	2023-2024
3.	Environment Audit	ELION TECHNOLOGIES & CONSULTING P. LTD.	2023-2024



Principal

CHHATRAPATI SHIVAJI MAHARAJ INSTITUTE OF TECHNOLOGY
Near Shedung Toll Plaza, Old Mumbai-Pune Highway,
Shedung-Panvel. 410206



ENERGY AUDIT REPORT FOR CHHATRAPATI SHIVAJI MAHARAJ INSTITUTE OF TECHNOLOGY



Elion Technologies & Consulting Private Limited

307, 3rd Floor, DDA Lal Market, H-Block

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Acknowledgement

Elion Technologies and Consulting Pvt Ltd places on record it's thanks to Chhatrapati Shivaji Maharaj Institute of Technology, Panvel for entrusting the task of conducting energy audit study.

We acknowledge with gratitude the whole hearted support and cooperation extended by all team members while carrying out the study.



Site Information

Name of College	Chhatrapati Shivaji Maharaj Institute of Technology
College Address	92/A Mumbai- Pune old Highway near Shedung Toll Plaza Shedung, Ta- Panvel, Dist- Raigad-410206
Execution Partner	ELION Technologies & Consulting Pvt Ltd
Communication Address	307, 3rd Floor DDA Lal Market H-Block Vikas Puri, New Delhi-110018
Date of Audit	16 th January 2024
Year of Audit	2024 – 2025
Site Team who participated in the Study	Chhatrapati Shivaji Maharaj Institute of Technology
Main Energy Consuming Machines/Equipment's considered for Energy Audit	<ul style="list-style-type: none"> • Lighting & Fans • Air Conditioners • Motors & Pumps • Desktops & Printers



Executive Summary

Chhatrapati Shivaji Maharaj Institute of Technology, a premier Institute in Mumbai is firmly rooted and has been verdantly bloomed. It adopts an interactive approach in teaching which enhances creative thinking analytical findings and effective communicative skills. Keeping at pace with globalization and resurgence of an open economy, the Institute tries to equip the students with information and training in entrepreneurship skills and communication. We take pride in being a cohesive group who shares the fundamental aims the staff specializes in excellence and high standard achievers.

At Chhatrapati Shivaji Maharaj Institute of Technology, we believe in providing a holistic and enriching experience for our students. Our carefully curated events offer a diverse range of opportunities to explore passions, develop skills, and forge lifelong connections. From thrilling festivals and inspiring speaker series to engaging workshops and impactful social initiatives, we have something for everyone.

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St. Wilfred's is a conscious and thoughtful response to a critical need for excellent and relevant education in a traditional, innovative and creative frame work. We take pride in being a cohesive group who shares the fundamental aims where the staff specializes in excellence and high standards of achievements.

Mission

- To cater to multiple abilities & intelligence present in learners for realization of their true potential and individual needs of developments.
- To instill among the students a sense of responsibilities to participate in citizenship duties and strive towards common welfare.
- To nurture overall development of the students through enrichment and quality education.
- To promote involvement of students with community outside the college and other social concerns through community service program.



List of courses offered by the institute:

- BE Mechanical Engineering
- BE Civil Engineering
- BE Computer Engineering

Electricity is supplied by Maharashtra State Electricity Distribution Co. Ltd. and for backup power supply - DG set of rating 125 KVA (Kirloskar) is available.

Also, solar power plant of capacity 80KW is installed in the college.

The energy audit included detailed data collection, analysis of data and identification of specific energy saving proposals.



Chapter 01: Introduction

Chhatrapati Shivaji Maharaj Institute of Technology, Panvel evinced interest in availing the services of Elion Technologies and Consulting Pvt Ltd for conducting energy audit of their premises.

Elion Technologies and Consulting Pvt Ltd team conducted the Detail Energy audit on 12th April 2024.

This report is on the energy audit carried out in Chhatrapati Shivaji Maharaj Institute of Technology, Panvel. The detailed energy audit comprised of the following activities:

- Data collection of power consuming equipment's.
- A brief session on energy management was conducted to seek more inputs from the personnel engaged in operation and maintenance of electro mechanical services.
- Analysis of collected data.
- Discussion with the officials on the identified proposals.
- Discussion and reporting of the findings of energy audit with the Engineers and management staff.

All the identified energy savings proposals have been discussed with the executives concerned before finalizing the projects.

The contents of the report are based solely on the data provided by Chhatrapati Shivaji Maharaj Institute of Technology, Panvel officials during the energy audit.

The management should implement the suggestions made in the report after verifying requisite safety aspects.

Methodology for Energy Audit:

The following is a list of general procedure and information undertaken during the energy audit:

- General information of the site.
- Baseline energy description.
- Past energy consumption bills which include electricity bills.



-
- On site data collection
 - Energy analysis of different sectors.
 - Recommendation of energy conservation measures.

The primary goal of the energy audit was to identify sources and areas of potential energy savings and cost saving throughout the Plant by measures of optimization, replacement, retrofitting, and on the other hand, to also provide recommendations on operational and maintenance practices improvements.



Chapter 02: Energy Consumption Details

List of equipment present in the campus:

Rating of Transformer (in KVA)	630KVA
Year of installation of the Transformer	2023-24
Rating of DG Set (in KVA)	125KVA
Rating of Capacitor Bank (if present)	NA
Capacity of Solar Power Plant (if installed)	80 KW

The main areas of energy consumption as observed during the audit are as follows:

- Air Conditioners
- Lighting & Fans
- Motors & Pumps
- Desktops & Printers

The main sources of energy to meet the required consumptions are as follows:

- Electricity supply from Maharashtra State Electricity Distribution Co. Ltd.
- DG sets of rating 125 KVA (Kirloskar).
- Solar power plant of capacity 80KW.

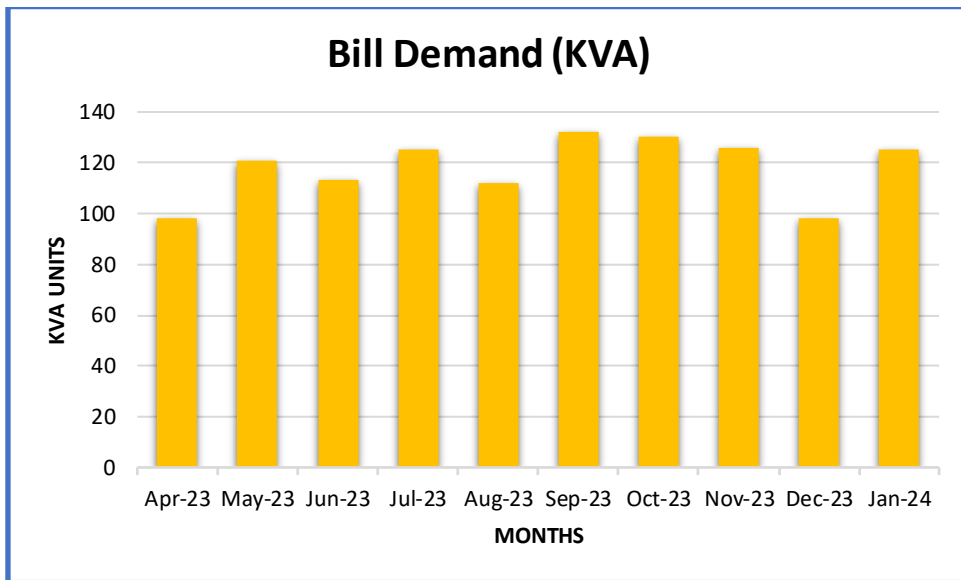
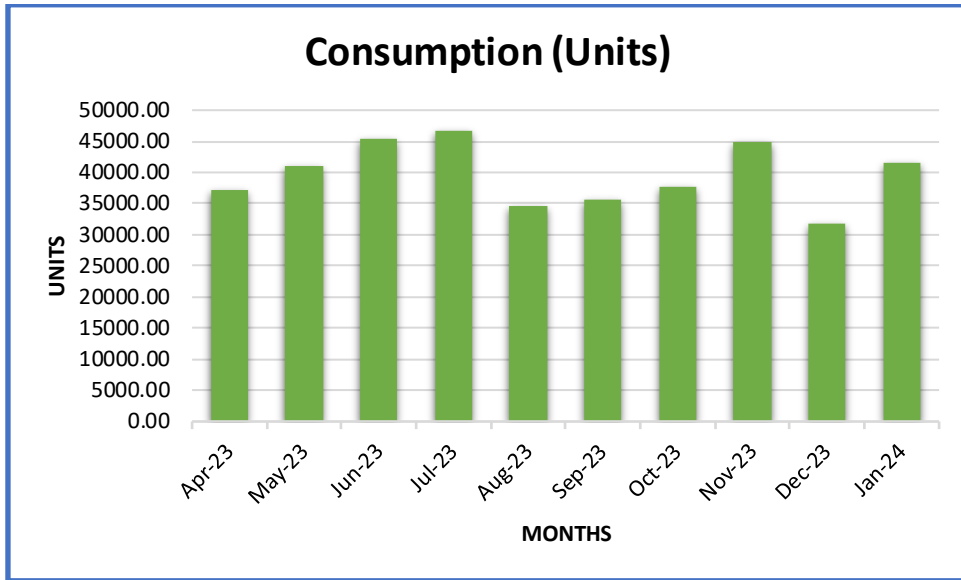


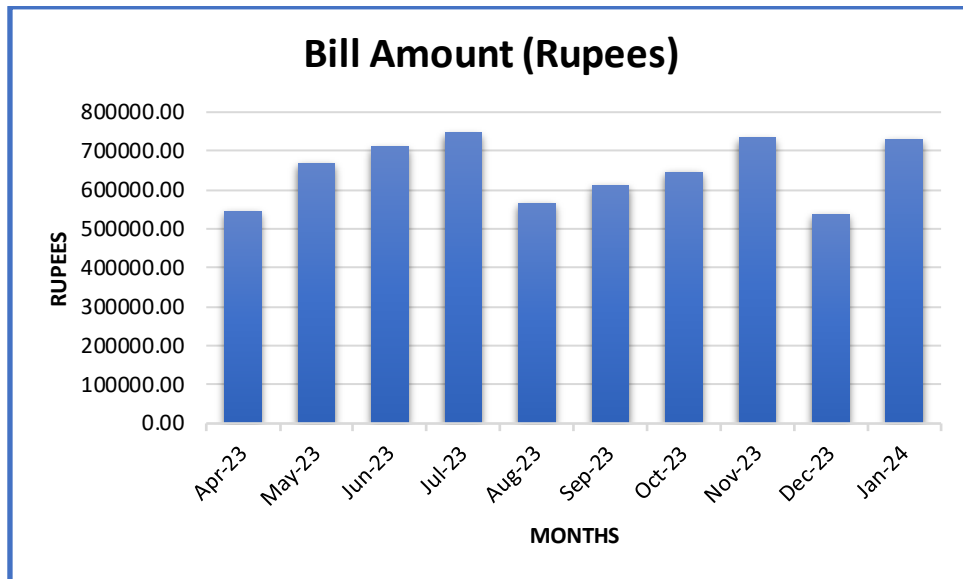
DG Set

Consumption pattern for energy is given below:

Available electricity bills for the year were collected and following is the summary for energy meter.

Bill Month	Consumption (Units)	Bill Demand (KVA)	Bill Amount
Jan-24	41589.00	125	730981.52
Dec-23	31878.00	98	537267.22
Nov-23	44965.00	126	734325.95
Oct-23	37809.00	130	646336.93
Sep-23	35701.00	132	612231.28
Aug-23	34514.00	112	565979.52
Jul-23	46633.00	125	746836.81
Jun-23	45408.00	113	711679.62
May-23	41147.00	121	668311.36
Apr-23	37290.00	98	546052.15







Chapter 03: Lighting System

The lighting inventory of the colleges present in the university were collected and following is the summary:

Type of lights (LED/CFL/Conventional Bulb/Tube Light)	Location	Rating	Quantity	Number of Hours being turned on
LED Tube lights	Ground floor	10-20W	45	08
LED Bulbs and Tube lights	1 st Floor	10-20W	64	08
LED Bulbs and Tube lights	2 nd Floor	10-20W	47	08
Ceiling LED	3 rd Floor	15-25W	15	08

Observation:

It was observed that energy efficient LED lights are installed in the campus. College management has replaced all the conventional lights with LED lights.

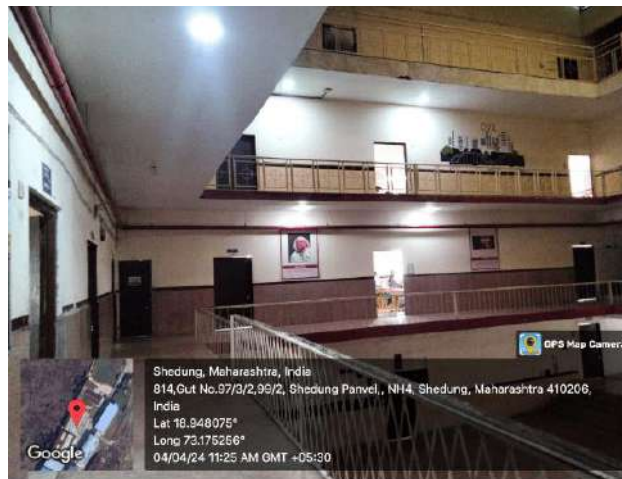
Recommendation:

- Occupancy sensors can be installed in cabins and spaces where continuous lighting is not required.
- Sticker to SWITCH OFF LIGHT and SAVE ENERGY to be displayed.
- Regular cleaning of light fixtures to be done to get maximum lux level.





LED Lights in Corridor



LED Lights in Corridor



Chapter 04: Pumps and Motors

Pump is generally used for pumping of ground water to the water tank. The details of the pumps are given below:

Name of Pump and make	Running Hours	Rated Capacity in KW	Flow Rate	Head	RPM
Kirloskar Three phase Mono block	5 hrs.	10 HP	-	-	1500

Name of Pump and make	Discharge Pressure
Kirloskar Three phase Mono block	17.5 LPS

Observation:

All pumps and motors are functioning properly and well maintained.

Recommendation:

Proper maintenance and upkeep of pump and motor to be done.



Pump Name Plate Details



Pump Starter



Pump Borewell



Chapter 05: Air Conditioning

Split ACs are used in facility for air conditioning. Following is the list of ACs present in the campus:

Type of AC (Windows/Split/Package and Location)	Capacity in Ton	Whether any star rating available	Set Temperature	Running Hours	Whether AC performance is satisfactory (Yes/No)
Windows VOLTAS – Principal Office Room	1	2	26	13	Yes

Observation:

- All air conditioners are found to be functioning properly and well maintained.
- Most of the air conditioners used are 3-star which is a good practice.

Recommendation:

- All doors to be kept closed while using the air conditioners and regular annual service of AC's should be carried out.
- Set Temperature of Air Conditioner shall be maintained at 26°C.
- A reduction in 1°C set point temperature, the energy cost comes down by 5%. By carefully selecting the seasonal temperature in different areas as per requirement considerable saving on account of power consumption can be achieved.
- Whenever Air Conditioners are replaced in future, BEE 5 star rated air conditioners shall be considered which are energy efficient.
- University management should consider installation of programmable microprocessor-based energy saver for air conditioners to achieve savings up to 30%.



Window AC



Chapter 06: Photographic Evidence



DG Set Name Plate



DG SET



LED Lights



LED Lights



Conclusion

The energy audit conducted at Chhatrapati Shivaji Maharaj Institute of Technology, Panvel has revealed that college is doing good work in having sustainable college. Energy efficient LED lights are installed in the entire campus. To further reduce energy consumption, college should implement the recommendation made in report.

End of Report



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DISCLAIMER

All information contained in this report is based on the data available and observations made during the audit. All recommendations made in this audit report should be duly evaluated by the management before implementation.

Elion Technologies and Consulting is not liable for any damages incurred by the organization through implementation of the energy saving proposals either to it or to any third party getting impacted by the implementation of this report.

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**GREEN AUDIT REPORT
FOR
CHHATRAPATI SHIVAJI MAHARAJ
INSTITUTE OF TECHNOLOGY**



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Date of Audit	16 th January 2024
Year of Audit	2024 – 2025
Audit Participants	Chhatrapati Shivaji Maharaj Institute of Technology
Total Covered Area of College	6500 Sq. M
Total Green Area	1600 Sq. M



Overview of Institute

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Introduction

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyse environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students' better understanding of green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus, it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO₂ from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

Advantages of Green Audit:

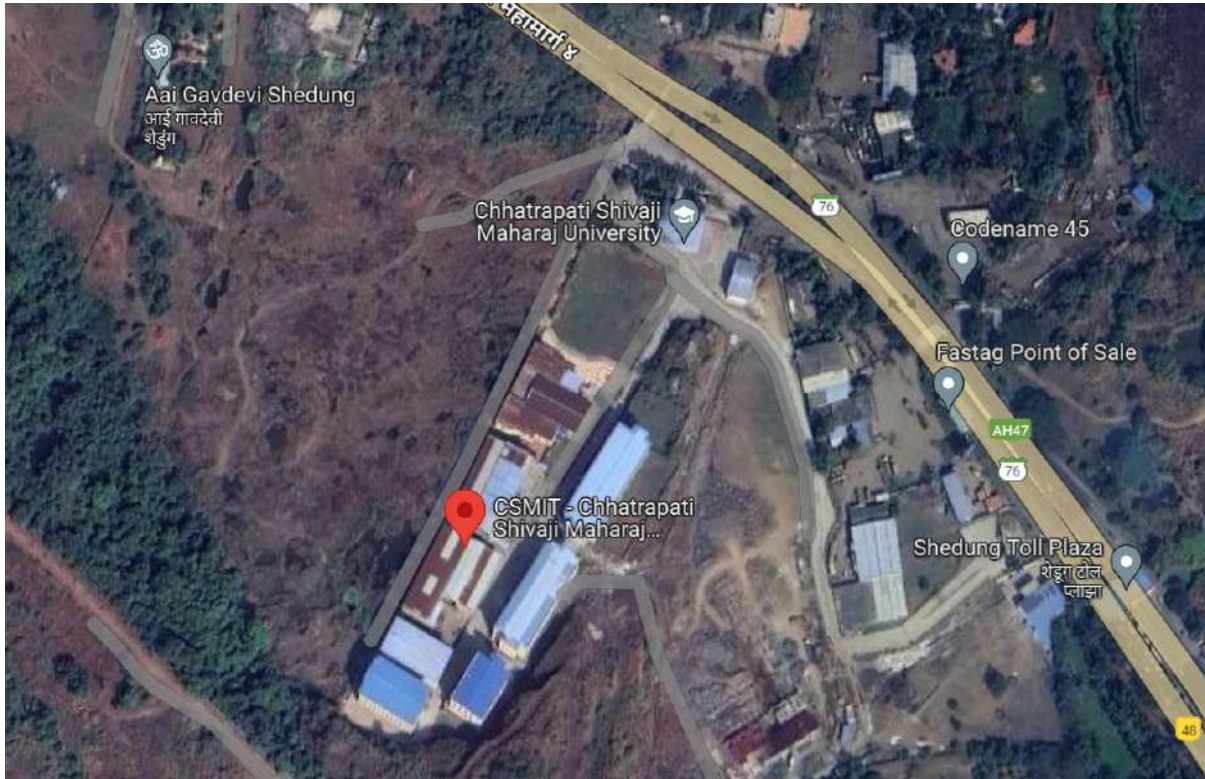
Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Some main advantages of green Audit are:

- It helps to shield the environment.
- Minimizing the waste and managing the cost.
- Authenticate conformity with the implemented laws.
- Minimizing the energy consumptions and focus on green and clean energy.
- Ambient Environmental Condition.
- Awareness and Training on Sustainability for Students.
- Awareness about environmental guidelines and duties.

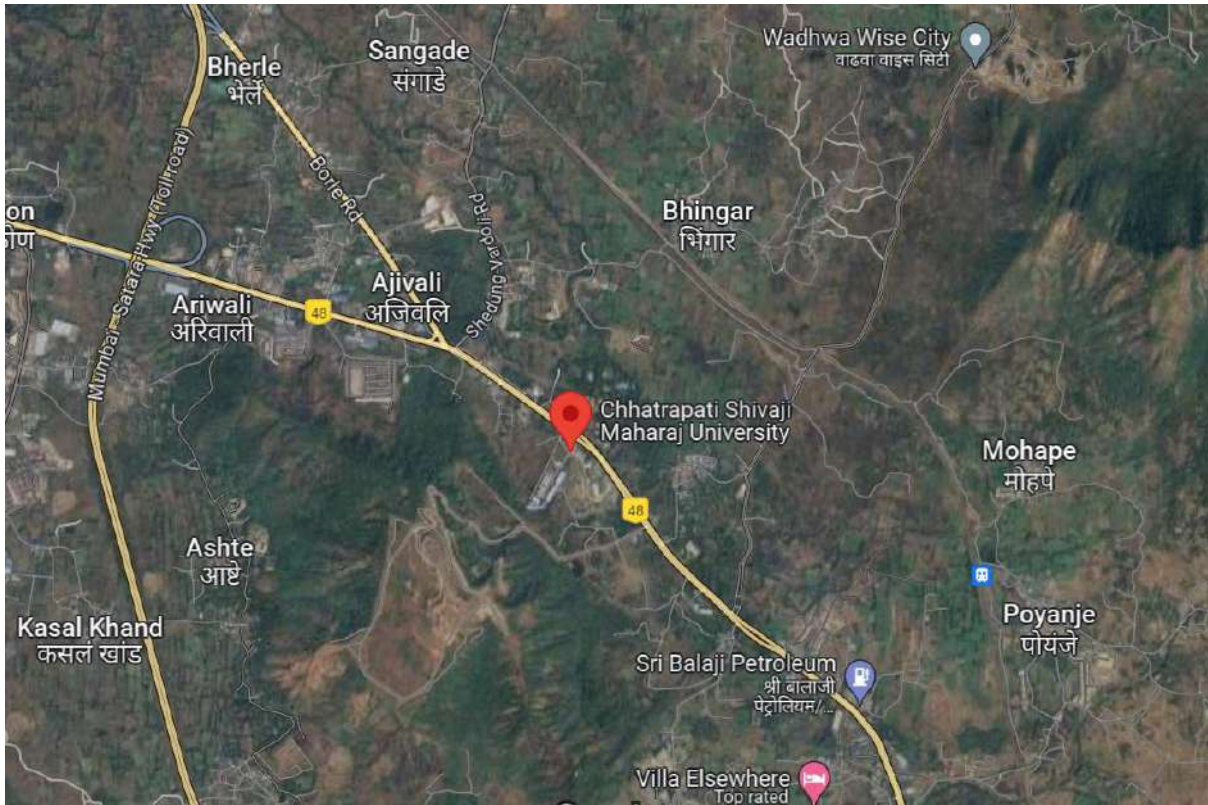


Environment Setting

The land use around the campus is mainly comprised of Greenland and highways.



CHHATRAPATI SHIVAJI MAHARAJ INSTITUTE OF TECHNOLOGY



Location of CHHATRAPATI SHIVAJI MAHARAJ INSTITUTE OF TECHNOLOGY



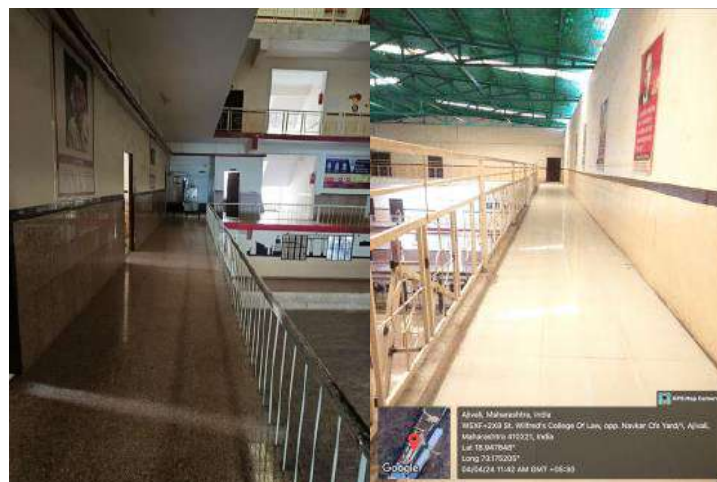
Green Audit

For Green Audit following 13 major areas (including their subsections) were covered and compliance/ initiatives under these areas were verified/ validated.

- a) Good Daylight Design and Ventilation
- b) Water Efficiency
- c) Wastewater Management
- d) Indoor Air Quality
- e) Energy Efficiency
- f) On-site Energy Generation
- g) Temperature and Acoustic Control
- h) Paper Waste Management
- i) E-Waste Management
- j) Canteen and Solid Waste Management
- k) Universal Access and Efficient Operation and Maintenance of Building
- l) Green Belt
- m) Green Programs (Green initiatives)

3.1 Good Daylight Design and Ventilation

- a) Corridors are wide with good ceiling height. All the corridors receive good daylight.



Spacious Corridors

- b) Classrooms, Labs and Library have large windows. Adequate daylight is received through the windows during daytime.





Ventilated & illuminated Classrooms

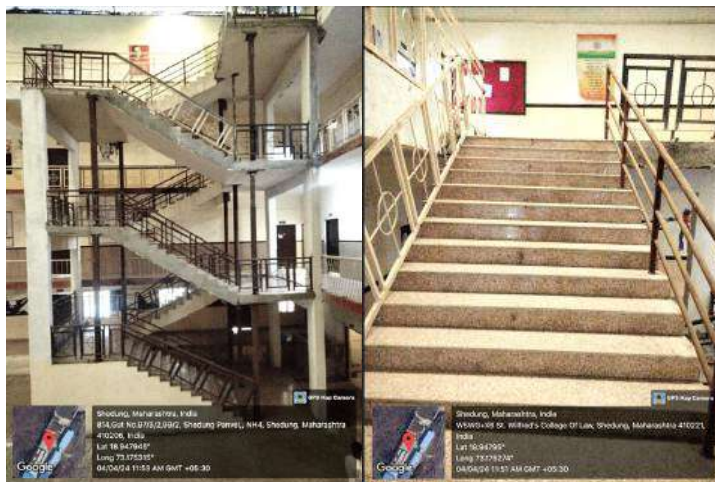
c) Classroom walls, corridors and labs are white-washed, this enhances the daylight received.





d) Washrooms are provided with exhaust fans to disperse heat, fumes and odors.

e) Stair cases receive daylight through windows provided at various levels.



Illuminated Staircases

f) Curtains are provided on some of the windows to avoid glare.

3.2 Water Efficiency:

a) Ground water and government supply is the main source for water supply in the campus.

b) Pumps run approximately 12 hours/day.

c) Ground water is stored in various overhead tank, list is given below:

Location	Tank Capacity	Type (Underground/Overhead)
Near library	2000 Ltr	Overhead
3 rd floor	2000 Ltr	Overhead



d) Water coolers are used for drinking purposes at first and third floor.



e) Normally mops are used for floor cleaning.

f) Normal taps are used for handwash purpose, it is recommended to install water efficient taps.

g) Dual flushing system is not provided in the washrooms.



- h) Signages are provided in washrooms emphasizing water conservation.
- i) Water from air conditioning unit and reject water from water purifiers is used for washing utensils in hostel mess and watering the plants

3.3 Wastewater Management:

- a) Sewage treatment plant is available in the campus.



- b) Treated water is then used in watering the plants.

3.4 Indoor Air Quality;

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, as it relates to the health and comfort of building occupants. Some common



indoor pollutants are listed as below:

- Molds and other allergens – This may arise from water seeping into the building envelope or skin, plumbing leaks, condensation due to improper ventilation, or from ground moisture penetrating a building part.
- Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels.
- Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.
- Carbon dioxide – Due to human respiration
- Particulate matter – Due to construction and maintenance activities

Major observations under indoor air quality are as below:

- a) In classrooms the mode of ventilation is natural (through windows) and is enhanced by fans. Air conditioners are used in some of the rooms.



- b) Indoor plants are seen in the College. Indoor plants can be plotted not only for the aesthetic appearance but also for health benefits. Refer Annexure 1 for details.



Indoor Plantation

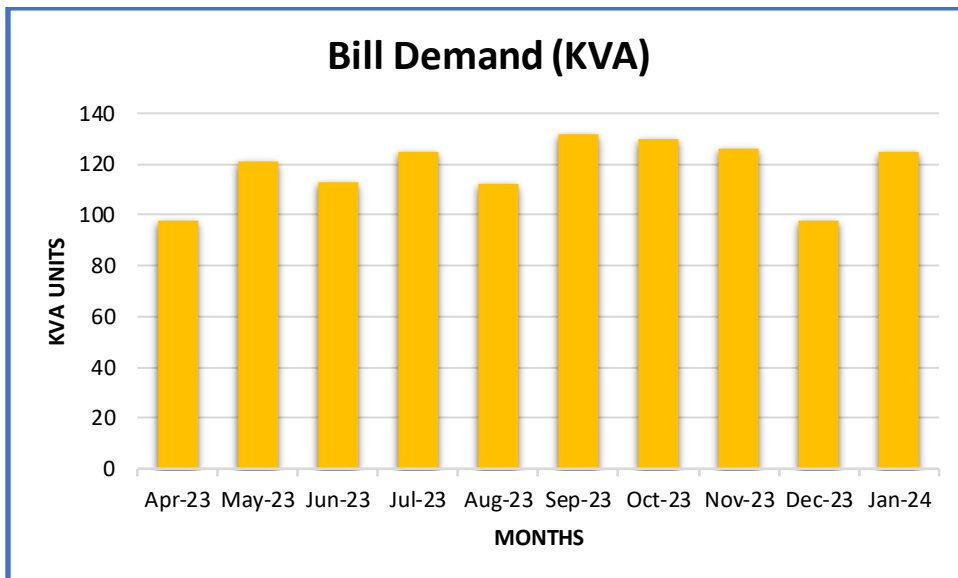
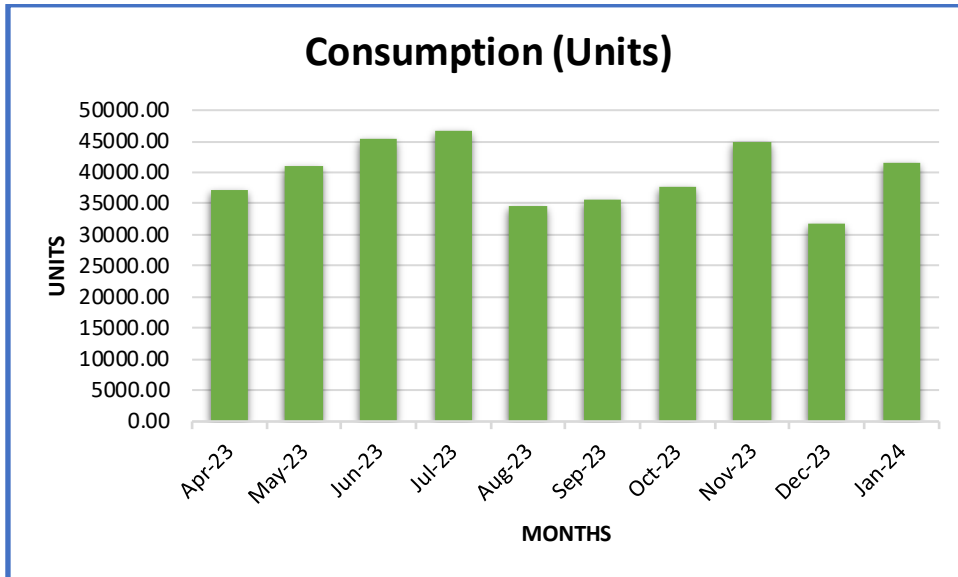
- c) Exhaust fans are provided in the washrooms and labs.
- d) Green belts have been set up in campus area.
- e) Indoor Air Quality tests have not been carried out. Same needs to be carried out at least once a year.

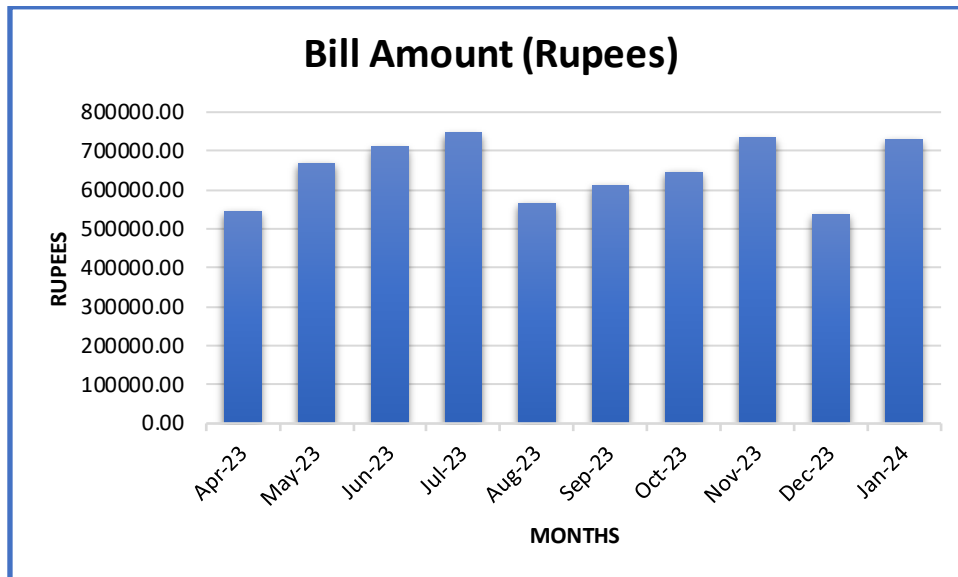
3.5 Energy Efficiency:

Electricity:

Power is supplied by Maharashtra State Electricity Distribution Co. Ltd. The major electricity consuming equipment installed in the campus are Windows and Split AC, Submersible Motor, Motors, Desktop, Printer, Fan, Tube light, LED Bulb etc.

Following are details of energy consumption:



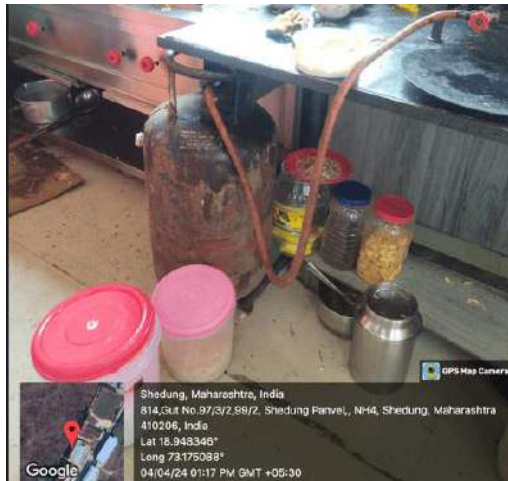


It was observed that:

- a) Campus has air conditioners which are in good working condition.
- b) Energy efficient LED lights are installed in campus which helps in reducing the energy consumption. And LED bulbs are being replaced with the dysfunctional conventional tube lights and bulbs by the Institute.
- c) The Institute is significantly moving towards other source of energy and installed a 80KW solar energy system in the Campus to fulfil its requirement. The purpose is to limit the use of conventional energy resources such as electricity and Diesel.
- d) The Institute have control over uses of ACs and limit the use during transition period of seasons.

3.6 On Site Energy Generation (usage of LPG/ Natural Gas):

- a) LPG is provided in the canteen for cooking.



LPG Cylinder

- c) Multiple DG sets are available for the backup supply, list is provided below:
- d) Solar Power plant of capacity 80KW is provided in the college.

3.7 Temperature and Acoustic Control

- a) White washed rooms & corridors and white/ off-white flooring improve the lighting conditions.
- b) The entire campus has green area some specific locations are near main gate, garden area and around college.

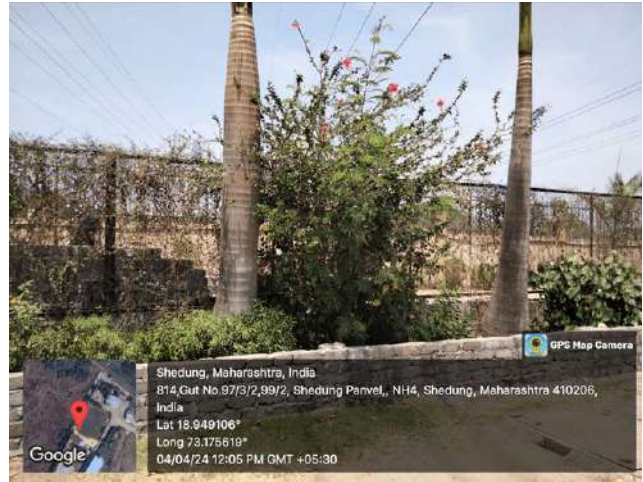


Plantation and trees

- c) The campus has done tree plantation all around which helps in reducing



temperature.



d) There is no noise pollution around the campus.

3.8 Paper Waste Management:

Being academic institution, waste paper is the main solid waste generated in the premises. As per the University prescription, we preserve the answer scripts and assignments papers of the students for a period of 5 years. Then the papers are sold to the local vendors in bulk and in turn they give us fresh A4 size bundles. Some of the Assignment Papers are used as rough papers by using the back side of the papers. Paper notices are filed for documentation purposes.

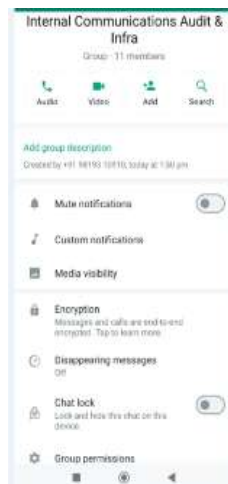
The College has taken steps to minimize and avoid paper usage.

It was observed that:

- a) Prints and photocopies are taken on both sides of the pages to avoid excess paper usage. Rather than photocopy, digitalization (scanning) is practiced.
- b) Papers are kept for a reasonable time before destruction of records.



- c) Faculty and administration staff uses old papers and envelopes for internal usages as rough work, file markers, page separators etc.
- d) Mostly, the internal communication is done through WhatsApp groups. The college has created a domain mail for all its faculty and staff. The paper notices are used with an intention of documenting the files as per the requirements of the University, NAAC and NBA.



WhatsApp Chats

3.9 E-Waste Management:

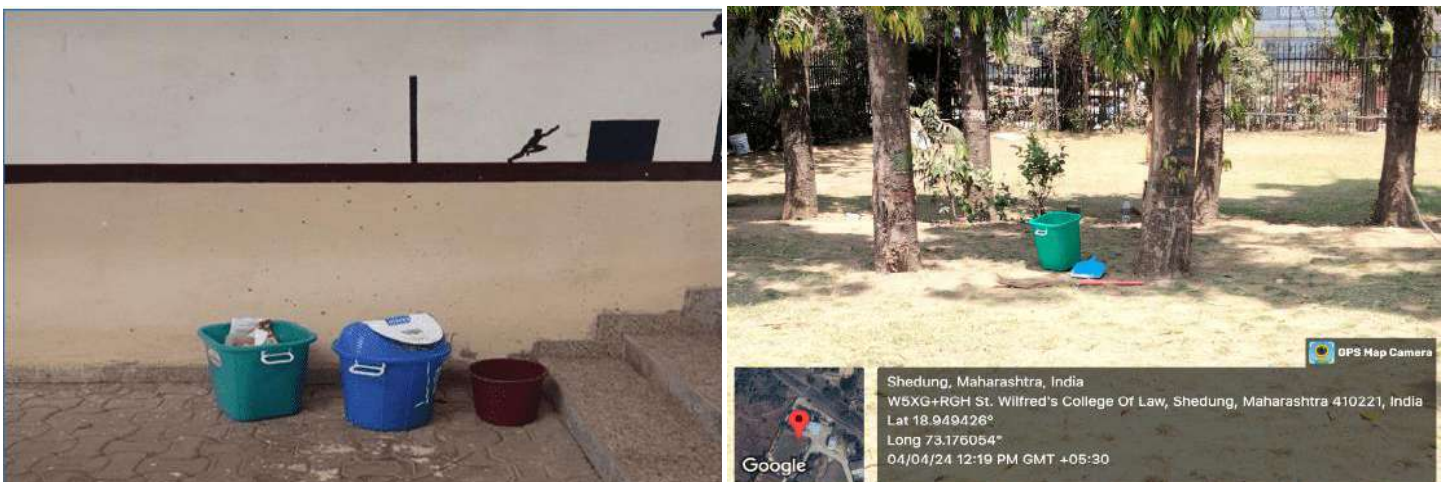
- a) The campus is digitalized to a large extent. This includes classrooms, library, internal mails etc.
- b) Green Policy is not available in the campus.



3.10 Solid Waste Management:

It was observed that:

- a) We have ensured that every classroom contains a dustbin, so as to enable the students to throw the litter into them.
- b) Wet waste and dry waste segregation is practiced in the premises. Separate bins are provided for wet biodegradable and dry recyclable waste.



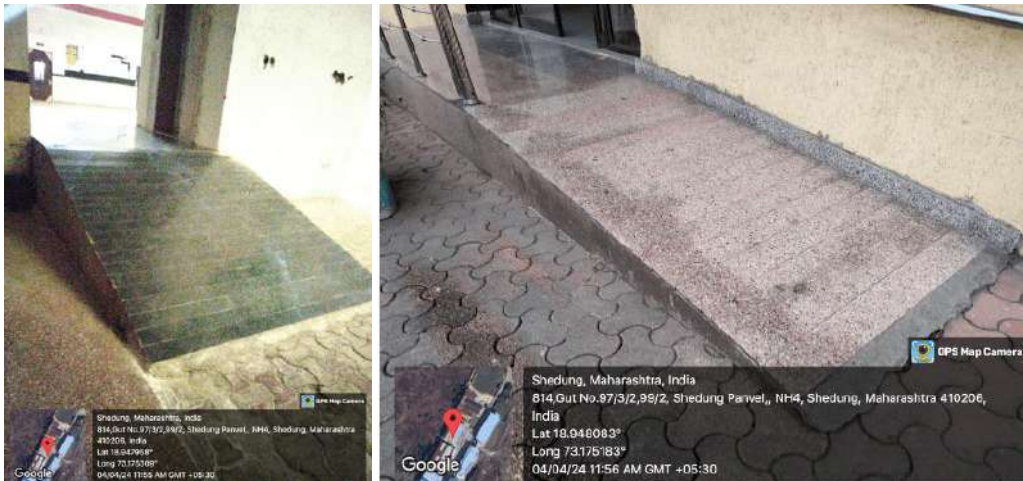
Segregated Dustbin

- c) The waste generated is disposed of by Municipal Corporation.

3.11 Universal Access and Efficient Operation and Maintenance of Building:

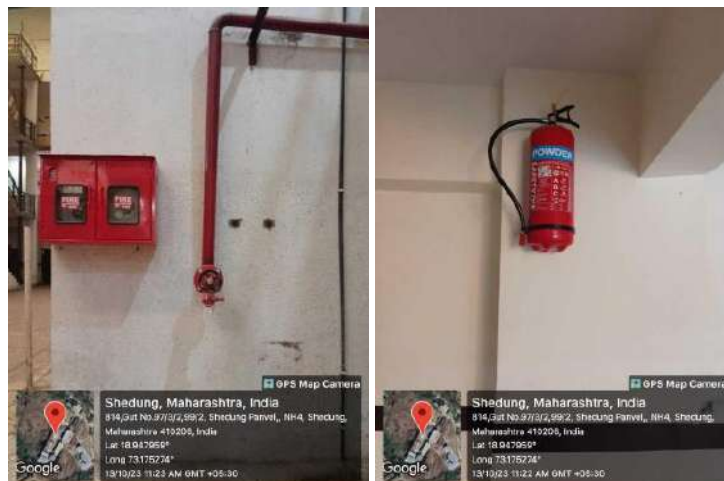
It was observed that:

- a) College is easily accessible. Staircase and ramps are provided for staff and students.



Ramps

- b) Since staircases are 3.5 feet wide and uncluttered, it is possible to have a safe evacuation during emergency.
- c) Fire Fighting equipment's are provided for emergency. They are inspected and serviced by fire protection Service Company annually.



Fire Fighting System is installed

- d) Directional exit signages and floor markings are present on every floor of the campus.
- e) Regular Fire Safety Trainings is not given to staff of the college on regular basis.

3.12 Green belt/ Landscaping:



- a) Large trees and plants are planted in the premises. Plantation also helps maintaining lower temperatures of the area.





Trees

3.13 Green Initiatives:

- a) College is regularly celebrating cultural programs along with Environment Day, Yoga Day, Earth Day etc.





World Environment Day is celebrated annually on 5 June and encourages awareness and action for the protection of the environment.



b) Solar power plant of 80 KW is available in the campus.



Solar Panel



Recommendations/Suggestions

For Improving Energy Consumption:

- a) Every classroom and lab with central switch board can have a diagram linking location of a tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.
- b) Installation of automatic lights with sensors can be considered.
- c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing. Equipment with star rating, using eco-friendly materials; with safe disposal policy to be preferred. Policy of returning equipment at the end of life span to the supplier to be preferred.
- d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum star ratings could be purchased, which will consume less energy, ensure environmental sustainability and also operate at low cost.
- e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.
- f) If possible, computers should be switched off from main power connections.
- g) Notices/signages can be put up/displayed near switches and on notice boards, informing students and staff to switch off all electricals when not in use.
- h) Control sensors can help to reduce consumption by automatically dimming lights when people are not around, and keeping blinds open to use natural light & reduce energy consumption.
- i) Raise awareness:
 - Encourage students to help in monitoring energy consumption & implement corrective actions.
 - Integrate energy education into classroom learning.

Water Conservation:

- a) Provide information on water usage and savings to students/ staff through notices, screen savers in computer labs.
- b) Dry sweep or use a sponge broom, when possible, instead of using a hose to clean floors, sidewalks, or other hard surfaces.
- c) Minimize/ reduce water usage by installing water saving faucets such as pressmatic taps, tap aerators, jet sprays etc.
- d) Installation of waterless urinals can be considered to reduce water consumption.
- e) Water balance diagram can be prepared to quantify the water consumption by installing water meters at key points. Based on data gathered, appropriate measures can be taken to reduce the water consumption.



Paper and other Solid Waste Reduction:

- a) Inventories of all solid waste generated in the premises must be maintained.
- b) Enhance recycling. This can be done by creating a group where students can recycle books, personal clothes and other material to needy students. This can be an initiative under green program.
- c) Standard Operating Procedures (SOP) for Solid and E-waste management and for recycling of waste should be prepared & practiced. The SOP's may include collection, segregation and reuse of different types of wastes, if any (e.g. biodegradable waste for composting). This will help in safe disposal of waste to recycle agencies.
- d) Training as well as awareness programs should be organized on segregation of biodegradable waste and recycling of waste. Efforts should be taken to inform students about recycling options and signs should be posted on appropriate bins indicating what could be dumped in each bin.
- e) The college can introduce online app, which can be useful for conducting internal exams, assignment/ reports submission. This system can also be used for displaying important notices, timetables.
- f) Paper usage shall be monitored to understand the impact of digitization in the facility.




Others:

- a) Water from air conditioning unit and reject water from water purifiers is not used anywhere, same should be utilized.
- b) Indoor Air Quality tests have not been carried out. Same needs to be carried out at least once a year.
- c) Environmental advisory committee could be formed. The discussions/ information sharing among different departments can generate lot of ideas and awareness on green issues.
- d) Maintain minutes of meetings of environmental committees; evaluate the effectiveness of various environmental programs conducted by the institutes. Set annual targets for Green Initiatives & monitor them closely. Create 'Green Champions'.
- e) Since each student uses computer lab, the screen savers can be set up for creating environmental awareness. (Ergonomics, water conservation etc.). Short 30 second pop up can be displayed on computer screens when they are on standby mode. Or wallpapers informing students about environment conservation can be created.
- f) Consider detailed energy audit (energy consumption, thermal emission, visual comfort) and water audit.
- g) Adopt environmentally responsible purchasing policy, and work towards creating and implementing a strategy to reduce environmental impact of its purchasing decision.







Annexure 1 – Indoor Gardening Details





Indoor plants are commonly used for their aesthetics benefits but they also have vital role reducing airborne pollution. The right choice of plants can be an excellent way of improving indoor air quality and general health. Local landscape contractor can be contacted for supply and rotation of these plants.

Plants	VOC it removes	Indoor source of VOC's	Plant care
 Aloe Vera	Formaldehyde, Trichloroethylene and Benzene	Chemical based cleaners and paints	Easy to grow with enough sunlight
 Bamboo Plant	Formaldehyde, Trichloroethylene and Benzene	Paints, Plastics, Wood products etc.	Thrives under low light conditions as well as easy to maintain
 Chinese Evergreen	Benzene	Paints	Low maintenance plant that prefers low light conditions.




 <p>English Ivy</p>	<p>Formaldehyde, Benzene, Air borne fecal matter particles</p>	<p>Wood, Paper products, Air borne fecal – matter particles from pests</p>	<p>Easy to maintain</p>
 <p>Janet Craig</p>	<p>Formaldehyde, Benzene and Trichloroethylene</p>	<p>Paints, Plastics, Wood products etc.</p>	<p>Medium to low light tolerant plant. Requires little water for growth.</p>
 <p>Golden Pothos or Devils Ivy</p>	<p>Formaldehyde, Cleanses air</p>	<p>Exhaust fumes, carpeting materials, panelling and furniture products made with particle board</p>	<p>Extremely easy to maintain under low to bright light conditions. Fast growing and grows well under Fluorescent light.</p>
 <p>Mass Cane</p>	<p>Formaldehyde, benzene and trichloroethylene</p>	<p>Paints, Plastics, Wood products etc.</p>	<p>Medium to low light tolerant plant. Requires little water for growth.</p>



 <p>Snake plant</p>	<p>Formaldehyde and trichloroethylene</p>	<p>cooking fuels, wood products, facial tissues, personal care products and waxed papers</p>	<p>Drought resistant and Tolerates a variety Of light conditions. Hard to damage or kill.</p>
 <p>Peace Lily</p>	<p>Formaldehyde, benzene and trichloroethylene</p>	<p>Paints, Plastics, Wood products etc.</p>	<p>Relatively easy to maintain. Survives in low light conditions.</p>
 <p>Red-edged Dracaena</p>	<p>Formaldehyde and trichloroethylene</p>	<p>cooking fuels, wood products, facial tissues, personal care products and waxed papers</p>	<p>Drought resistant and Tolerates a variety of light conditions. Hard to damage or kill.</p>
 <p>Spider Plant</p>	<p>Formaldehyde, benzene, carbon monoxide and xylene</p>	<p>cooking fuels, wood products, Printing</p>	<p>Easy to maintain under medium to bright light condition.</p>



	Purifies indoor air	-	Easy to maintain
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Parlor Palm



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**ENVIRONMENT AUDIT REPORT
FOR
CHHATRAPATI SHIVAJI MAHARAJ
INSTITUTE OF TECHNOLOGY**



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Acknowledgement

Elion Technologies and Consulting Pvt Ltd thanks the management of Chhatrapati Shivaji Maharaj Institute of Technology, Panvel for assigning this important work of Environmental Audit. We appreciate the co-operation to our team for completion of study.

For giving us necessary inputs to carry out this very vital exercise of Environment Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.



Site Information

Name of College	Chhatrapati Shivaji Maharaj Institute of Technology
College Address	92/A Mumbai- Pune old Highway near Shedung Toll Plaza Shedung, Ta- Panvel, Dist.- Raigad - 410206
Execution Partner	ELION Technologies & Consulting Pvt Ltd
Communication Address	307, 3rd Floor DDA Lal Market H-Block Vikas Puri, New Delhi - 110018
Date of Audit	16 th January 2024
Year of Audit	2024 – 2025
Audit Participants	Chhatrapati Shivaji Maharaj Institute of Technology
Total Covered Area of College	6500 Sq. M
Total Green Area	1600 Sq. M



Concept

The term 'Environmental audit' means differently to different people. Terms like 'assessment', 'survey' and 'review' are also used to describe similar activities. Furthermore, some organizations believe that an 'environmental audit' addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters. Although there is no universal definition of Environmental Audit, many leading companies/ institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989).

The ICC defines Environmental Auditing as:

"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."

The European Commission, in its proposed regulation on environmental auditing, has also adopted the ICC definition of Environmental Audit.



Introduction

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

Environmental Management Systems (EMS) is very popular in the industrial sector, but the general belief is that EMS is something pertaining to industries only. Other parts of the world have started adopting compatible environmental management systems either voluntarily or for promoting standards by external certification. International environmental standards do not suit the existing Indian educational system.

A very simple indigenized system has been devised to monitor the environmental performance of educational institutions. It comes with a series of questions to be answered on a regular basis. Environmental conditions may be monitored from angles that are relevant to Indian requirements, without stress on legal issues or compliance. This innovative scheme is user-friendly and totally voluntary. The environmental monitoring system helps the institution to set environmental examples for the community and to educate young learners. It can be adapted to urban and / or rural situations.



Overview of Campus

Chhatrapati Shivaji Maharaj Institute of Technology, a premier Institute in Mumbai is firmly rooted and has been verdantly bloomed. It adopts an interactive approach in teaching which enhances creative thinking analytical findings and effective communicative skills. Keeping at pace with globalization and resurgence of an open economy, the Institute tries to equip the students with information and training in entrepreneurship skills and communication. We take pride in being a cohesive group who shares the fundamental aims the staff specializes in excellence and high standard achievers.

At Chhatrapati Shivaji Maharaj Institute of Technology, we believe in providing a holistic and enriching experience for our students. Our carefully curated events offer a diverse range of opportunities to explore passions, develop skills, and forge lifelong connections. From thrilling festivals and inspiring speaker series to engaging workshops and impactful social initiatives, we have something for everyone.

Our events foster personal growth, encourage collaboration, and celebrate the spirit of community. Whether it's showcasing talents, gaining practical skills, participating in sports competitions, experiencing cultural exchanges, or preparing for future careers, our event section is a hub of excitement and learning. Join us on this remarkable journey of self-discovery and create memories that will last a lifetime.

Stay tuned to our event section for upcoming events, as we continue to ignite curiosity and shape well-rounded individuals. Welcome to a world of opportunities, connections, and unforgettable experiences at Chhatrapati Shivaji Maharaj Institute of Technology.

Vision

St. Wilfred's is a conscious and thoughtful response to a critical need for excellent and relevant education in a traditional, innovative and creative frame work. We take pride in being a cohesive group who shares the fundamental aims where the staff specializes in excellence and high standards of achievements.

Mission

- To cater to multiple abilities & intelligence present in learners for realization of their true potential and individual needs of developments.
- To instill among the students a sense of responsibilities to participate in citizenship duties and strive towards common welfare.
- To nurture overall development of the students through enrichment and quality education.
- To promote involvement of students with community outside the college and other social concerns through community service program.



List of courses offered by the institute:

- BE Mechanical Engineering
- BE Civil Engineering
- BE Computer Engineering



Audit Objectives

The broad aims/ benefits of the eco-auditing system would be –

- Environmental education through systematic environmental management approach
- Improving environmental standards
- Benchmarking for environmental protection initiatives
- Reduction in resource use
- Financial savings through a reduction in resource use
- Curriculum enrichment through practical experience
- Development of ownership, personal and social responsibility for the college campus and its environment
- Enhancement of university profile
- Developing an environmental ethic and value systems in young people



Executive Summary

An environmental audit is a snapshot in time, in which one assesses campus performance in complying with applicable environmental laws and regulations. Though a helpful benchmark, the audit almost immediately becomes outdated unless there is some mechanism in place to continue the effort of monitoring environmental compliance.

This is second environmental audit of campus for NACC affiliation; QS Program and doing their bid towards environmental protection and environmental awareness at local and global front. Audit criterion is environmental cognizance, waste minimization and management, biodiversity conservation, water conservation, energy conservation and environmental legislative compliance by the campus. A questionnaire is used during audit. This audit report contains observations and recommendations for improvement of environmental consciousness.



Environmental Audit - Questionnaire

The areas of eco/environmental/green auditing to be followed/practiced by participating institutions:

- I. Waste Minimization and Recycling
- II. Greening
- III. Energy Conservation
- IV. Water Conservation
- V. Clean Air
- VI. Animal Welfare
- VII. Environmental Legislative
- VIII. General Practices

Is any Environmental Audit conducted earlier?

No

What is the total permanent population of the Campus?

	Male	Female	Total
Students	373	107	480
Teachers	-	-	-
Non-Teaching Staff	-	-	-
Sub Total	-	-	-
Approximate Number of Visitors (Per day)			20
What is the total number of working days of your campus in a year?			220

Where is the campus located?

The campus is located in Panvel, Maharashtra.



Which of the following are available in your campus?

1	Garden area	No
2	Playground	Yes
3	Kitchen	No
4	Toilets	Yes
5	Garbage Or Waste Store Yard	Yes
6	Laboratory	Yes
7	Canteen	Yes
8	Hostel Facility (Numbers)	Yes (02)
9	Guest House	Yes

Which of the following are found near your campus?

1	Municipal dump yard	Yes
2	Garbage heap	Yes
3	Public convenience	Yes
4	Sewer line	Yes
5	Stagnant water	No
6	Open drainage	Yes
7	Industry – (Mention the type)	Yes (Construction, Chemical, Pharmaceutical)
8	Bus / Railway station	Yes
9	Market / Shopping complex / Public halls	Yes



I - WASTE MINIMIZATION AND RECYCLING

1.	Does your campus generate any waste? If so, what are they?	Yes. Chemical waste, Solid waste, Liquid waste, E-waste
2.	What is the approximate amount of waste generated per day? (in Kilograms/month) (approx.)	30-40 kg/month
3.	How is the waste generated in the campus managed? By 1 Composting 2 Recycling 3 Reusing 4 Others(specify)	Waste generated like paper and scrap are given to the vendors which are then recycled further. Also, old newspapers are used to wrap gifts.
4.	Do you use recycled paper in campus?	Yes
5.	Do you use reused paper in campus?	No
6.	How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.	We conduct NSS activities to spread the message of recycling to others in the community.
7.	Can you achieve zero garbage in your campus? If yes, how?	No, but the institute has taken notable steps towards achieving zero garbage



II – GREENING THE CAMPUS

1.	Is there a garden in your campus?	Yes
2.	Do students spend time in the garden?	Yes
3.	Total number of Plants in Campus	200+
4.	Provide some names of trees and plants in the campus.	Rose plant, Aloe vera plant, Palm Tree, Lily, Jasmin
5.	Is the university campus have any Horticulture Department?	No
	If yes, number of Staff working in Horticulture Department?	-
6.	Number of Tree Plantation Drives organized by institute per annum. (If Any)	01/Year
7.	Number of Trees Planted in Last year.	30+
	Survival Rate	60%
8.	Plant Distribution Program for Students and Community	Yes
9.	Plant Ownership Program	No



III – ENERGY

1.	List down ways that you use energy in your campus. (Electricity, LPG, firewood, others). Using this list, try to think of ways that you could use less energy every day.	<ol style="list-style-type: none"> 1. Electricity, LPG, solar. 2. Switch off the lights, fans & other electrical appliances when not needed. 3. Keep your electronics on a low brightness setting to save energy
2.	Are there any energy saving methods, equipments, techniques employed in your campus? If yes, please specify. If no, suggest some	<ul style="list-style-type: none"> • Switch off the lights, fans & other electrical appliances when not needed. • Keep your electronics on a low brightness setting to save energy
3.	Give an estimate of number of lights installed in your campus along with numbers?	LED bulbs - 171
4.	Are any alternative energy sources employed/ installed in your campus? (photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.	Solar energy – 80KW Yes. These are solar energy like water heating, water treatment, indoor solar lightning, ventilation.
5.	Do you run “switch off” drills at campus?	Yes
6.	Are your computers and other equipment’s put-on power-saving mode?	Yes
7.	Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby modes most of the time? If yes, how many hours?	No



IV - WATER CONSERVATION

1.	List all the uses of water in your campus?	<ol style="list-style-type: none"> 1. Drinking & Cooking in canteen 2. Irrigation for Garden 3. Washing & Cleaning 4. Washrooms
2.	How does your campus store water? (mention tanks with capacity) Are there any water saving techniques followed in your campus?	Institute is having Water storage Tanks with storage capacity of 2000 Ltrs.
3.	If there is water wastage, specify why and how can the wastage be prevented/ stopped?	<ul style="list-style-type: none"> • Turning Off the Tap when Not in Use. • Repairing the leakages at the earliest. • Disposing of tissues in the dustbin rather than inside the toilets
4.	Locate the point of entry of water and point of exit of waste water in your campus. Entry- Exit-	<p>Entry – Ground water tank near college main gate.</p> <p>Exit – Sewage outside institute</p>
5.	Write down few ways that could reduce the amount of water used in your campus?	<ul style="list-style-type: none"> • By Detecting and repairing the leaks so that wastage of water will get reduce. • By Avoiding flushing the toilet unnecessarily. • Usage of sprinklers while watering the plants and trees.
6.	Record water use from the campus water meter for six months (record at the same time of each day). At the end of the period, compile a table to show how many litres of water have been used.	Water meters are currently not installed in the Institute
7.	Does your campus harvest rain water? (Please explain the method and uses)	Yes, ground water recharge through pits and trench for collecting diversion of rain water
8.	Is there any water recycling System.	No



V - CLEAN AIR

1.	Are the Rooms in Campus are Well Ventilated?	Yes				
2.	Number of windows per room (aggregate value to be provided)	02-03 per room				
3.	What is the ownership of the vehicles used by your institute? (Please Tick ✓ only one)	-	Yes			
		✓	Operator-owned vehicles			
		-	Institute-owned vehicles			
		-	A combination of campus-owned and operator-owned vehicles			
4.	Provide details of institute-owned motorized vehicles?	Buses	Cars	Vans	Other	Total
	No. of vehicles	-	-	-	-	-
	No. of vehicles more than five years old	-	-	-	-	-
	No. of Air-conditioned vehicles	-	-	-	-	-
	PUC done	-	-	-	-	-
5.	Specify the type of fuel used by your institute's vehicles:	Buses	Cars	Vans	Other	
	Diesel	-	-	-	-	
	Petrol	-	-	-	-	
	CNG	-	-	-	-	
	LPG	-	-	-	-	
	Electric	-	-	-	-	
6.	Air Quality Monitoring Program (If Any)	Yes (National Clean Air Program)				
7.	Students suffer from respiratory ailments? (If Any)	No				
8.	Details of Diesel/Gas Generator. (Rating & Make)	1 Genset of 125 KVA capacity				



VI – ANIMAL WELFARE

1.	List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.) (if any)	Birds and Squirrels are commonly found in campus.
2.	How many dogs in your area have undergone Animal Birth Control - Anti Rabies (ABC - AR)?	No
3.	Does your campus have a Biodiversity Programme or a KARUNA CLUB?	No

VII - ENVIRONMENTAL LEGISLATIVE COMPLIANCE

1.	Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
2.	Does your campus have any rules to protect the environment? List possible rules you could include.	Yes. Rules included to protect the environment are – 1) Conserve water 2) Planting trees 3) Usage of LED bulbs 4) 3 R's – Reduce, Reuse and Recycle
3.	Dose Environmental Ambient Air Quality Monitoring conducted by the Campus?	Yes
4.	Dose Environmental Water and Wastewater Quality monitoring conducted by the Campus?	Yes
5.	Dose stack monitoring of DG sets conducted by the Campus?	Yes
6.	Is any warning notice, letter issued by state government bodies?	No



7.	Dose any Hazardous waste generated by the Campus? If yes explain its category and disposal method.	No
8.	Dose any Bio medical waste generated by the Campus? If yes explain its category and disposal method.	No

VIII – GENERAL

1.	Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
2.	Does your campus have any rules to protect the environment? List possible rules you could include.	Yes. Rules included to protect the environment are – <ul style="list-style-type: none"> • Conserve water • Planting trees • Usage of LED bulbs • 3 Rs – Reduce, Reuse and Recycle
3.	What is the housekeeping schedule of garden and common areas in your campus?	8:30 am to 5 pm
4.	Are students and faculties aware of environmental cleanliness ways? If Yes Explain	Yes. Environmental cleanliness ways are followed as– <ul style="list-style-type: none"> • No plastic • Segregating waste in blue and green dustbins • Encourage students to compost food waste such as fruits and vegetables scraps instead of throwing them in the trash.
5.	Does Important Days Like World Environment Day, Earth Day, and Ozone Day etc. celebrated in your Campus?	Yes
6.	Does Campus participate in National and Local Environmental Protection Movement?	Yes



7.	Does Campus have any Recognition/certification for environment friendliness?	Yes
8.	Does Campus use renewable energy?	YES, 80KW Solar Energy
9.	Does Institution conduct a green/environmental audit of its campus?	Yes
10.	Has the institution been audited/ accredited by any other agency such as NABL, NABET, TQPM, NAAC etc.?	No



Recommendations

- Air Quality monitoring Programme should be implemented and Indoor air Quality Tests shall be carried out yearly.
- Water meters shall be installed for better monitoring of water usage in the college
- Environmental Water and wastewater quality monitoring shall be carried out yearly.
- Water recycling system shall be installed in the campus.
- Water efficient taps shall be used in the campus for saving the water.
- Paper shall be used reused in the campus



Photographic Evidences



College Main Gate



College Main Gate





Garden Area



Garden Area



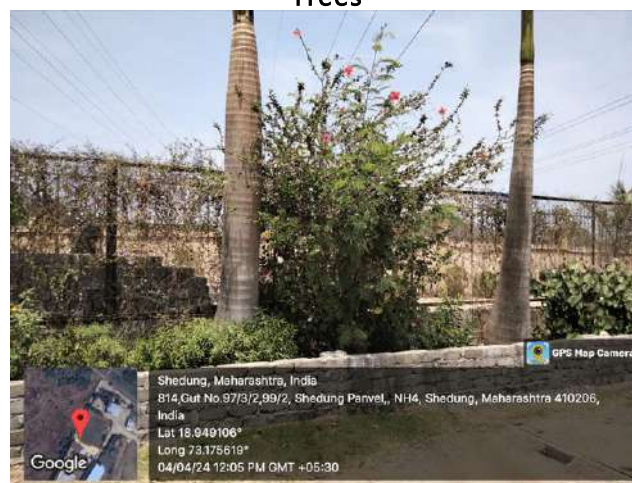
Garden Area



Trees



Trees



Trees and Plantation



Solar Panel



Solar Plant



Overhead Water Tank



Overhead Water Tank



Conclusion

This audit involved extensive consultation with all the campus team, interactions with key personnel on wide range of issues related to Environmental aspects. Overall, large amount of campus is for landscaping. The audit has identified several observations for making the campus premise more environmentally friendly. The recommendations are also mentioned with observations for university campus team to initiate actions.

The audit team opines that the overall site is maintained well from environmental perspective. There are no major observations but recommendation is made in this report which would further strengthen the goal to achieve 100% environment friendly campus.



References

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Water [Prevention & Control of Pollution] Cess Act-1977 (Amended 2003) and Rules- 1978
- The Air [Prevention & Control of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981)
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

End of Report



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Elion Technologies & Consulting Pvt Ltd

Certificate

This is to certify that Energy Audit at **Chhatrapati Shivaji Maharaj Institute of Technology, 92/A Mumbai- Pune old Highway near Shedung Toll Plaza Shedung, Ta- Panel, Dist.- Raigad - 410206** was carried out for the year **2024 - 25**.

It is found that sustainable measure are taken by the campus in reduction in energy consumption. Several measures are taken by college management for promoting energy efficiency. In-house solar power plant is also installed.

Audit Date – 16/01/2024
Valid Up to – 15/01/2025



Audit Officer

Certificate Number
EA/2024/CSMIT

Elion Technologies & Consulting Pvt Ltd

Certificate

This is to certify that Green Audit at **Chhatrapati Shivaji Maharaj Institute of Technology, 92/A Mumbai- Pune old Highway near Shedung Toll Plaza Shedung, Ta - Pannel, Dist.- Raigad - 410206** was carried out for the year **2024 - 25**.

College has submitted necessary data and credentials for scrutiny. The activities and measures carried out by the college have been verified. The efforts taken by the college towards environment and sustainability is highly appreciated and commendable.

Audit Date – 16/01/2024
Valid Up to – 15/01/2025



Audit Officer

Certificate Number
GA/2024/CSMIT

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Campus has submitted necessary data and credentials for scrutiny. The college has ample amount of greenery and plantation which helps in maintaining the good quality air all around the campus and also helps in preventing soil erosion. Water harvesting is also present in the campus.

Audit Date – 16/01/2024
Valid Up to – 15/01/2025


Audit Officer

Certificate Number
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